FIG. 1

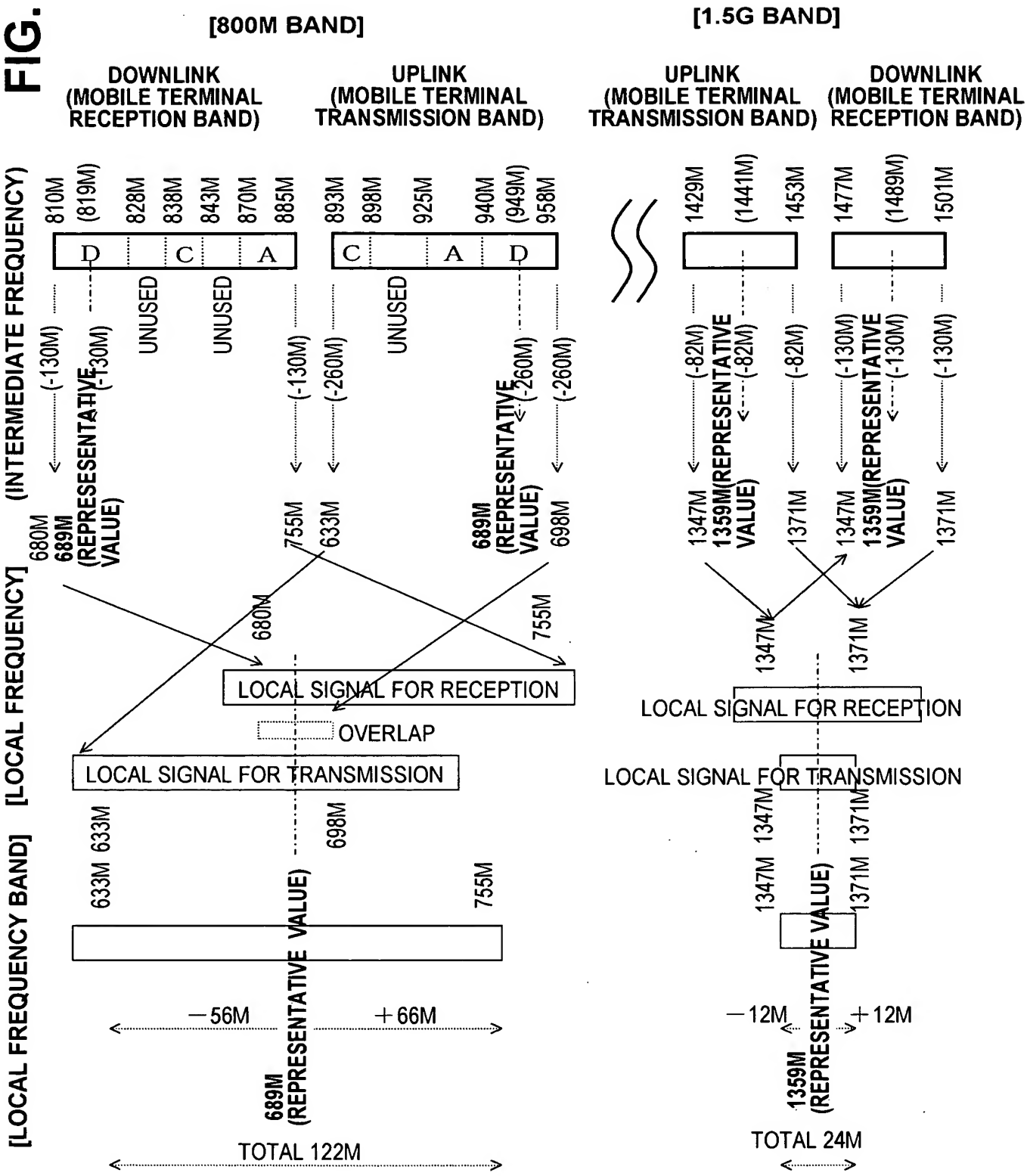

[800M BAND]
[1.5G BAND]
DOWNLINK (MOBILE TERMINAL RECEPTION BAND)
UPLINK (MOBILE TERMINAL TRANSMISSION BAND)
UPLINK (MOBILE TERMINAL TRANSMISSION BAND)
DOWNLINK (MOBILE TERMINAL RECEPTION BAND)
[LOCAL FREQUENCY BAND] [LOCAL FREQUENCY] (INTERMEDIATE FREQUENCY)
810M (819M) 828M 838M 843M 870M 885M
893M 898M 925M 940M (949M) 958M
1429M (1441M) 1453M
1477M (1489M) 1501M
D C A
C A D
UNUSED
UNUSED
UNUSED
(-130M)
(-260M)
(-82M)
1347M
1359M(REPRESENTATIVE VALUE)
1371M
680M
689M (REPRESENTATIVE VALUE)
755M
633M
698M
LOCAL SIGNAL FOR RECEPTION
OVERLAP
LOCAL SIGNAL FOR TRANSMISSION
−56M
+66M
−12M
+12M
689M (REPRESENTATIVE VALUE)
1359M (REPRESENTATIVE VALUE)
TOTAL 122M
TOTAL 24M

FIG. 2

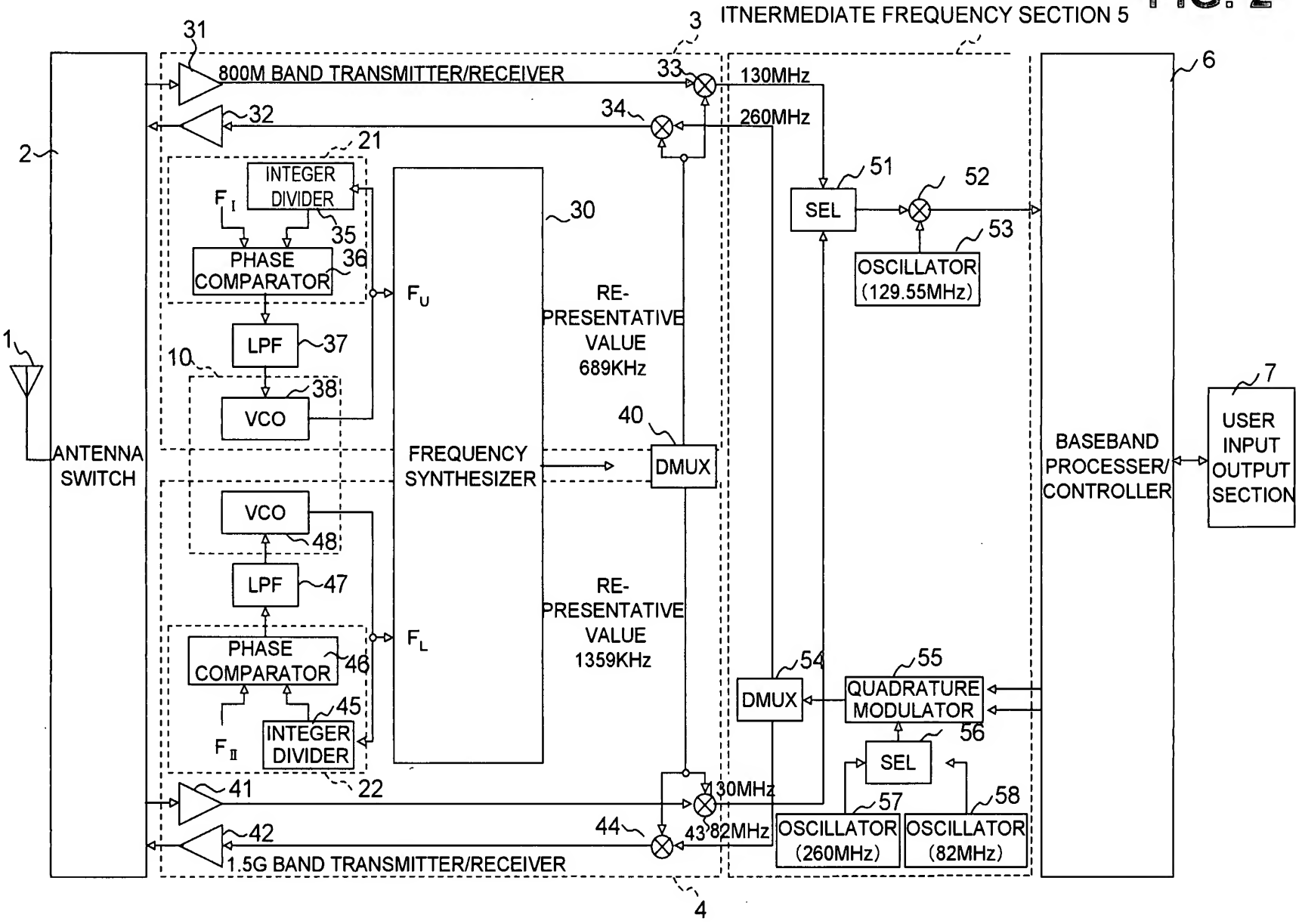

ITNERMEDIATE FREQUENCY SECTION 5
3
31
800M BAND TRANSMITTER/RECEIVER
33
130MHz
32
34
260MHz
2
21
INTEGER DIVIDER
F_I
35
PHASE COMPARATOR
36
30
F_U
RE-PRESENTATIVE VALUE 689KHz
LPF
37
1
10
VCO
38
40
ANTENNA SWITCH
FREQUENCY SYNTHESIZER
DMUX
VCO
48
LPF
47
RE-PRESENTATIVE VALUE 1359KHz
PHASE COMPARATOR
46
F_L
45
F_{II}
INTEGER DIVIDER
22
41
30MHz
42
44
43
82MHz
1.5G BAND TRANSMITTER/RECEIVER
4
51
SEL
52
53
OSCILLATOR (129.55MHz)
6
7
BASEBAND PROCESSER/ CONTROLLER
USER INPUT OUTPUT SECTION
54
DMUX
55
QUADRATURE MODULATOR
56
SEL
57
OSCILLATOR (260MHz)
58
OSCILLATOR (82MHz)

FIG. 3

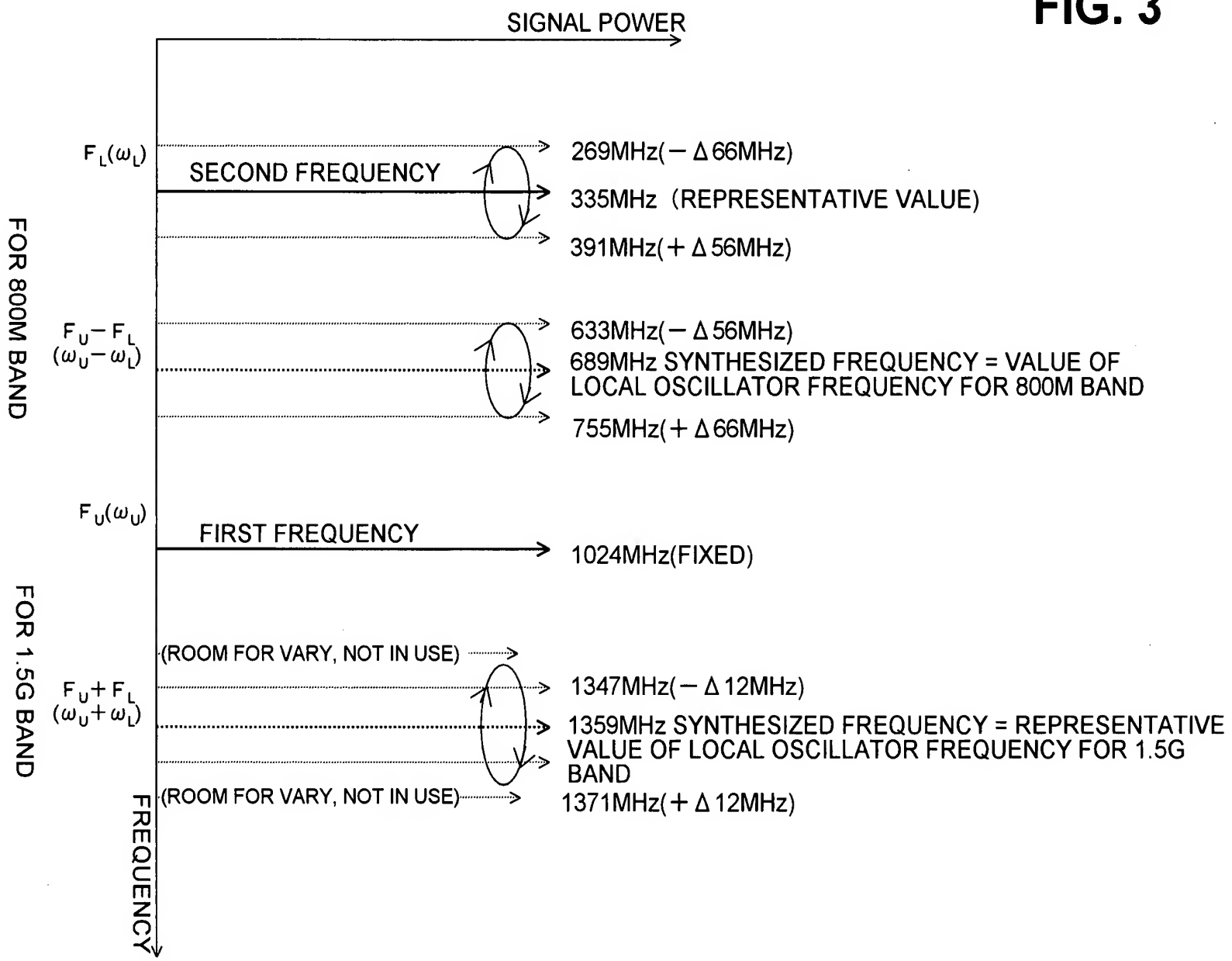

SIGNAL POWER
FOR 800M BAND
FOR 1.5G BAND
FREQUENCY
$F_L(\omega_L)$
SECOND FREQUENCY
269MHz(−Δ66MHz)
335MHz (REPRESENTATIVE VALUE)
391MHz(+Δ56MHz)
F_U-F_L
$(\omega_U-\omega_L)$
633MHz(−Δ56MHz)
689MHz SYNTHESIZED FREQUENCY = VALUE OF LOCAL OSCILLATOR FREQUENCY FOR 800M BAND
755MHz(+Δ66MHz)
$F_U(\omega_U)$
FIRST FREQUENCY
1024MHz(FIXED)
(ROOM FOR VARY, NOT IN USE)
F_U+F_L
$(\omega_U+\omega_L)$
1347MHz(−Δ12MHz)
1359MHz SYNTHESIZED FREQUENCY = REPRESENTATIVE VALUE OF LOCAL OSCILLATOR FREQUENCY FOR 1.5G BAND
(ROOM FOR VARY, NOT IN USE)
1371MHz(+Δ12MHz)

FIG. 4

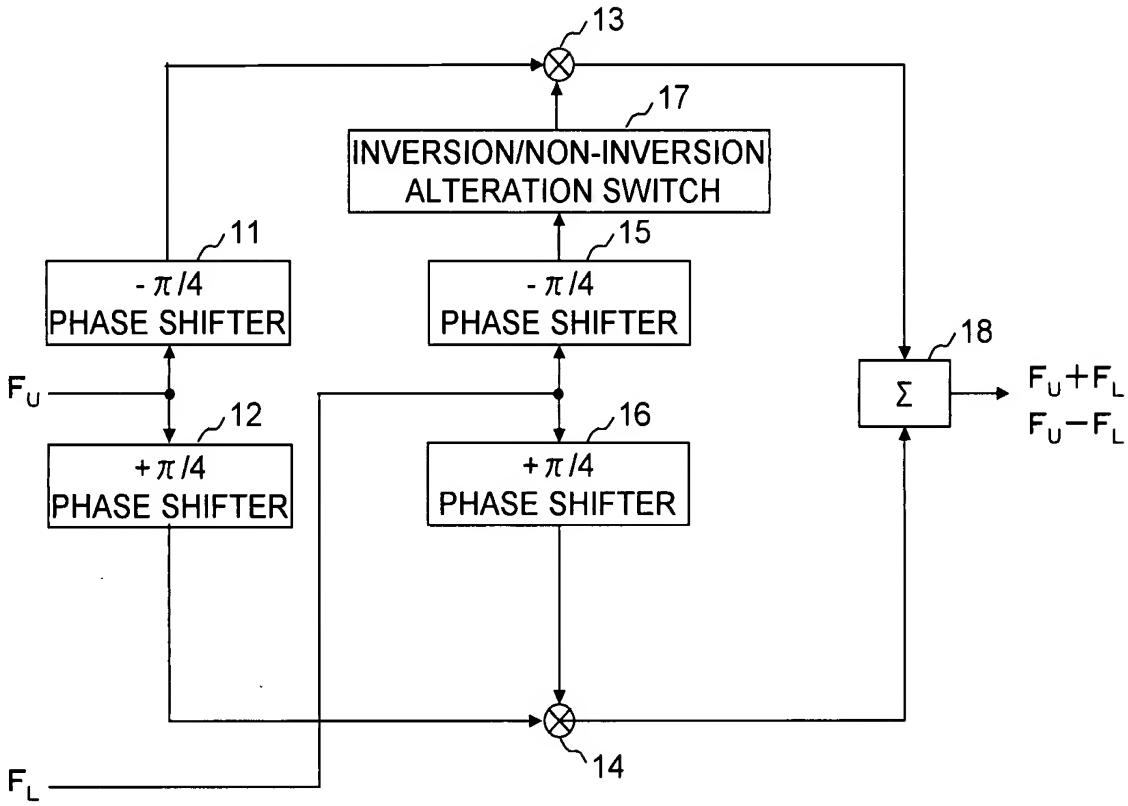

13
17
INVERSION/NON-INVERSION
ALTERATION SWITCH
11
15
- π/4
PHASE SHIFTER
- π/4
PHASE SHIFTER
18
Σ
F_U
F_U+F_L
F_U-F_L
12
16
+π/4
PHASE SHIFTER
+π/4
PHASE SHIFTER
14
F_L

FIG. 5

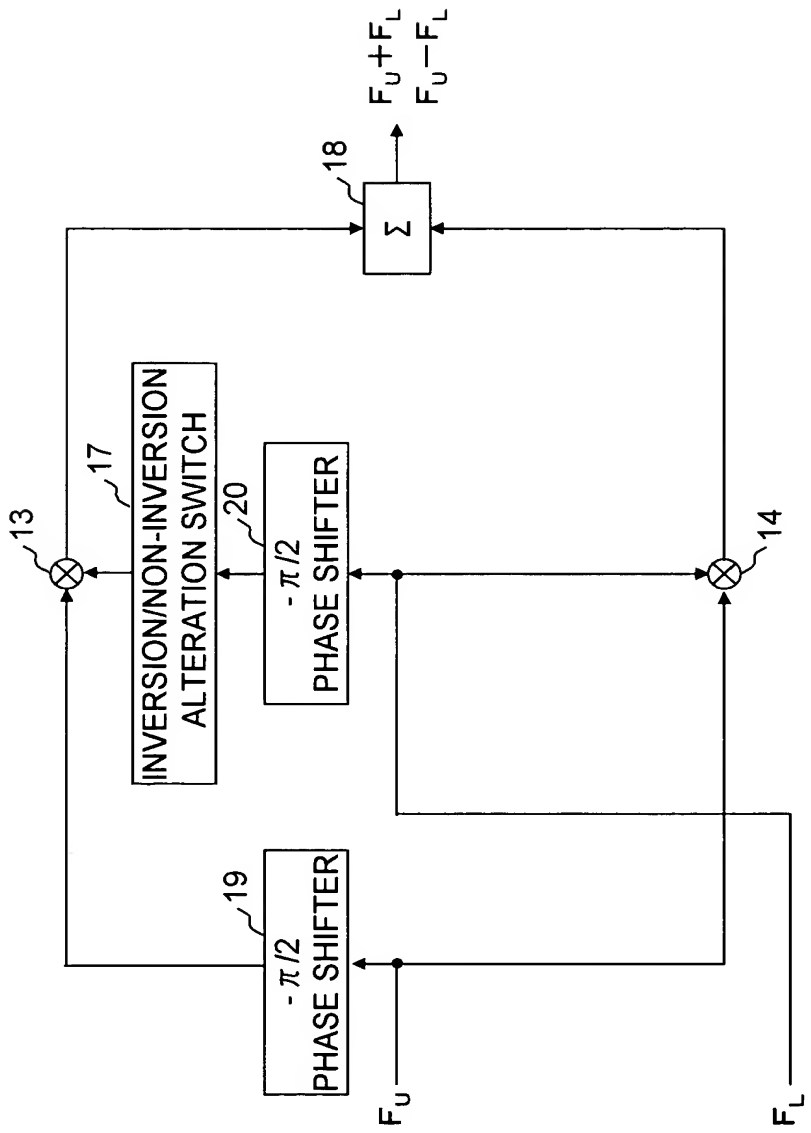

F_U+F_L
F_U-F_L
18
Σ
13
17
INVERSION/NON-INVERSION ALTERATION SWITCH
20
- π/2 PHASE SHIFTER
14
19
- π/2 PHASE SHIFTER
F_U
F_L

FIG. 6

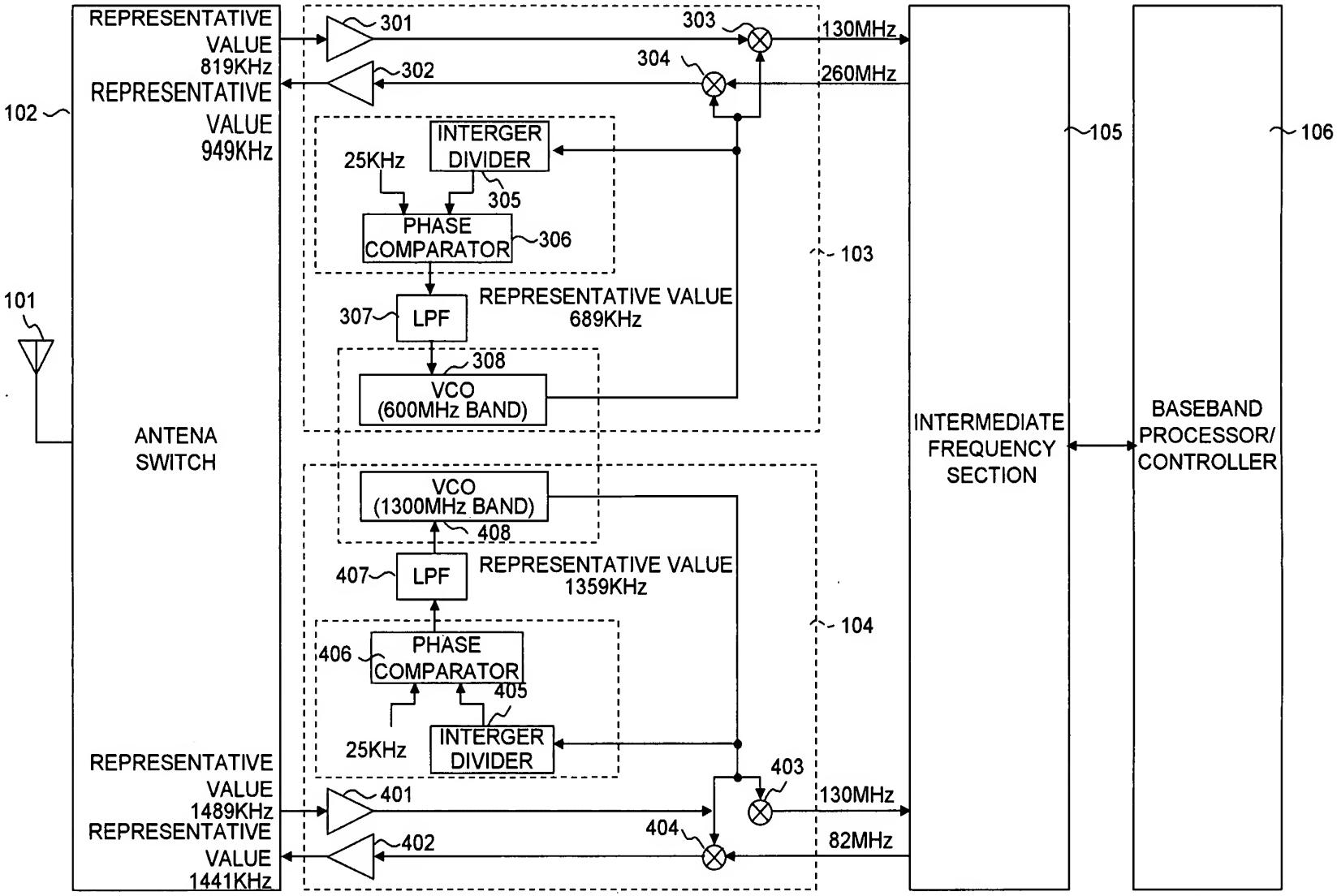
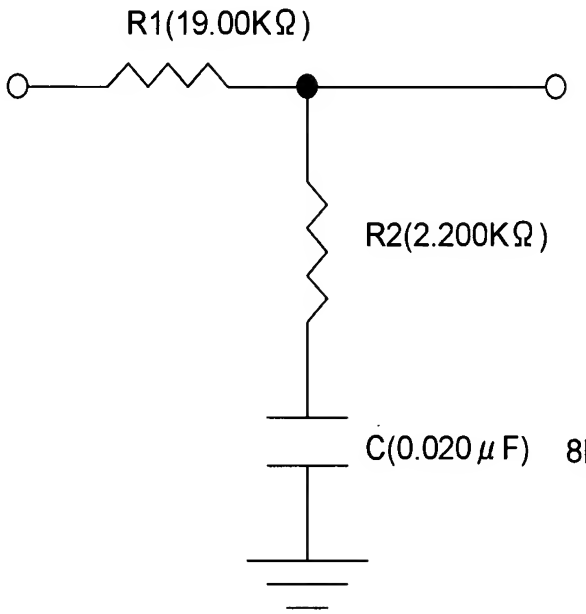

REPRESENTATIVE VALUE 819KHz
REPRESENTATIVE VALUE 949KHz
102
101
ANTENA SWITCH
301
302
303
304
130MHz
260MHz
105
106
INTERGER DIVIDER
25KHz
305
PHASE COMPARATOR
306
103
307
LPF
REPRESENTATIVE VALUE 689KHz
308
VCO (600MHz BAND)
INTERMEDIATE FREQUENCY SECTION
BASEBAND PROCESSOR/ CONTROLLER
VCO (1300MHz BAND)
408
407
LPF
REPRESENTATIVE VALUE 1359KHz
104
406
PHASE COMPARATOR
405
25KHz
INTERGER DIVIDER
403
REPRESENTATIVE VALUE 1489KHz
401
130MHz
404
REPRESENTATIVE VALUE 1441KHz
402
82MHz

FIG. 7



1.5G BAND SETTING EXAMPLE :

LPF TIME FACTOR $\tau 1 = C \cdot R1 = 0.020\mu \cdot 19.00K = 380.0\mu$ [s]

LPF TIME FACTOR $\tau 2 = C \cdot R2 = 0.020\mu \cdot 2.200K = 44.00\mu$ [s]

FREQUENCY DIVISION NUMBER N=1,359M[Hz]/25K[Hz]=54,360

DUMPING FACTOR $\zeta = 0.6$

PHASE COMPARATOR GAIN $K_p = 3[V]/(4\pi) = 2.355$ [V/rad]

∵CONTROLLED VOLTAGE 0~3[V]、

PHASE COMPARATOR RANGE $-2\pi \sim +2\pi = 4\pi$

CONTROL SENSITIVITY OF VOLTAGE CONTROLLED OSCILLATOR $K\nu$ = 8M [Hz/V] ≒50.24M[rad/s/V]

(DEPENDING ON VOLTAGE CONTROLLED OSCILLATOR)

∴LOOP GAIN $K = (K_p \cdot K\nu)/N = (2.355 \cdot 50.24M)/54,360 = 2.177$[s^(-1)]

〔CALCULATION RESULT〕

NATURAL ANGULAR FREQUENCY

$\omega n = \{K/(\tau 1 + \tau 2)\}^{1/2} = 2.266K$[rad/s]

NATURAL FREQUENCY $Fn = 2.266K/(2\pi) = 360.8$[Hz]

∴NATURAL VIBRATION PERIOD OF PHASE CONVERGENCE LOOP

$= 1/Fn = 2.772m$[s]

FIG. 8

EXAMPLE OF TRANSITIONAL RESPONSE IN CASE DUMPING FACTOR $\zeta = 0.6$

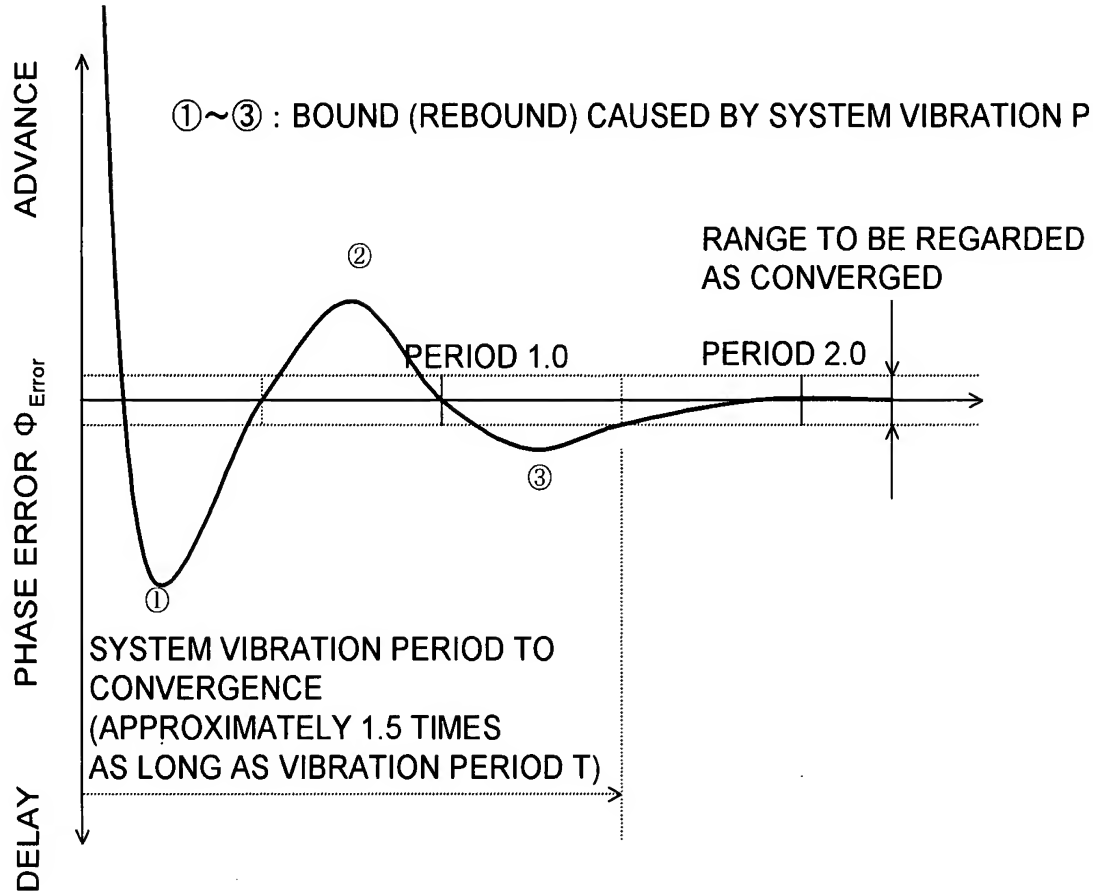


FIG. 9

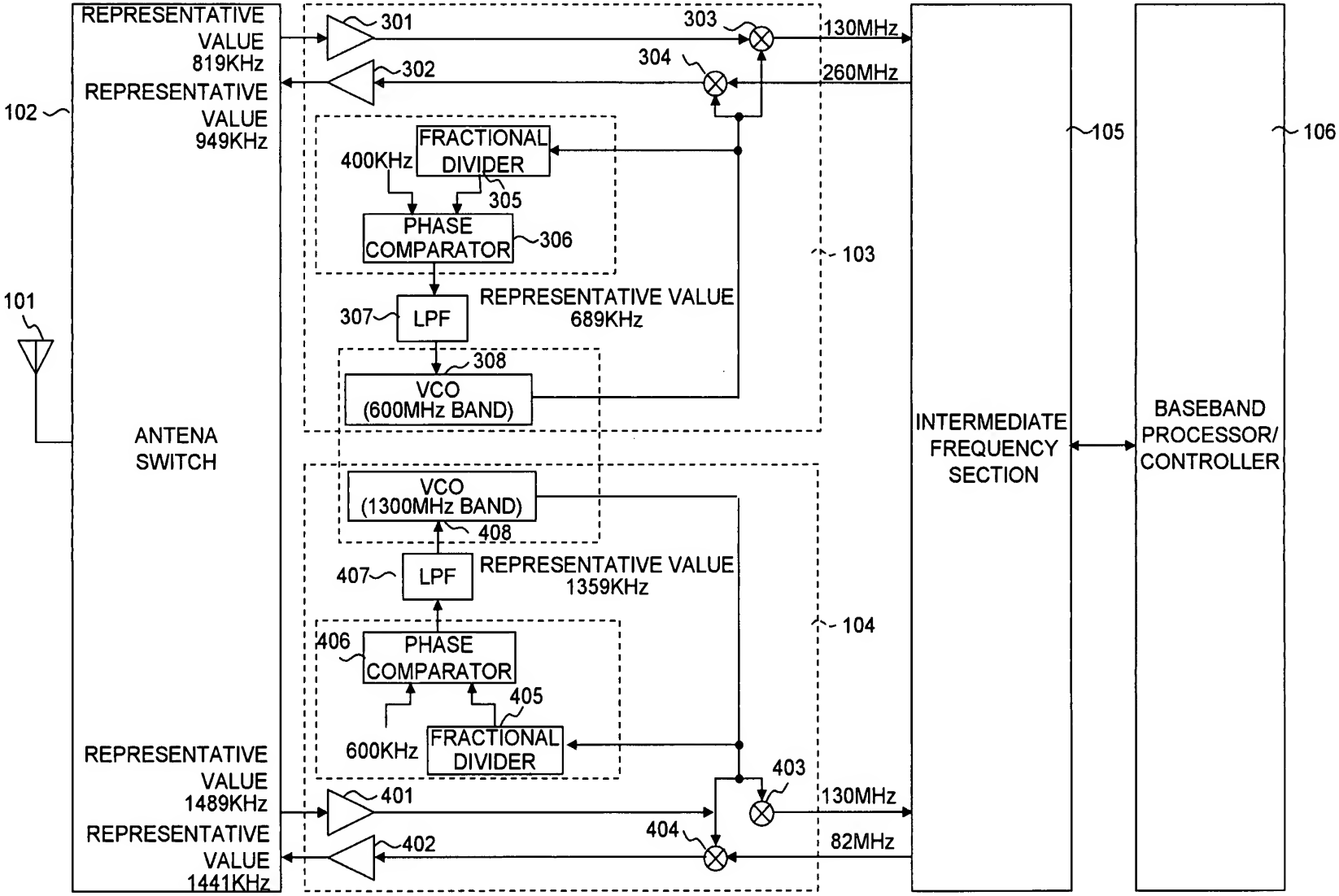
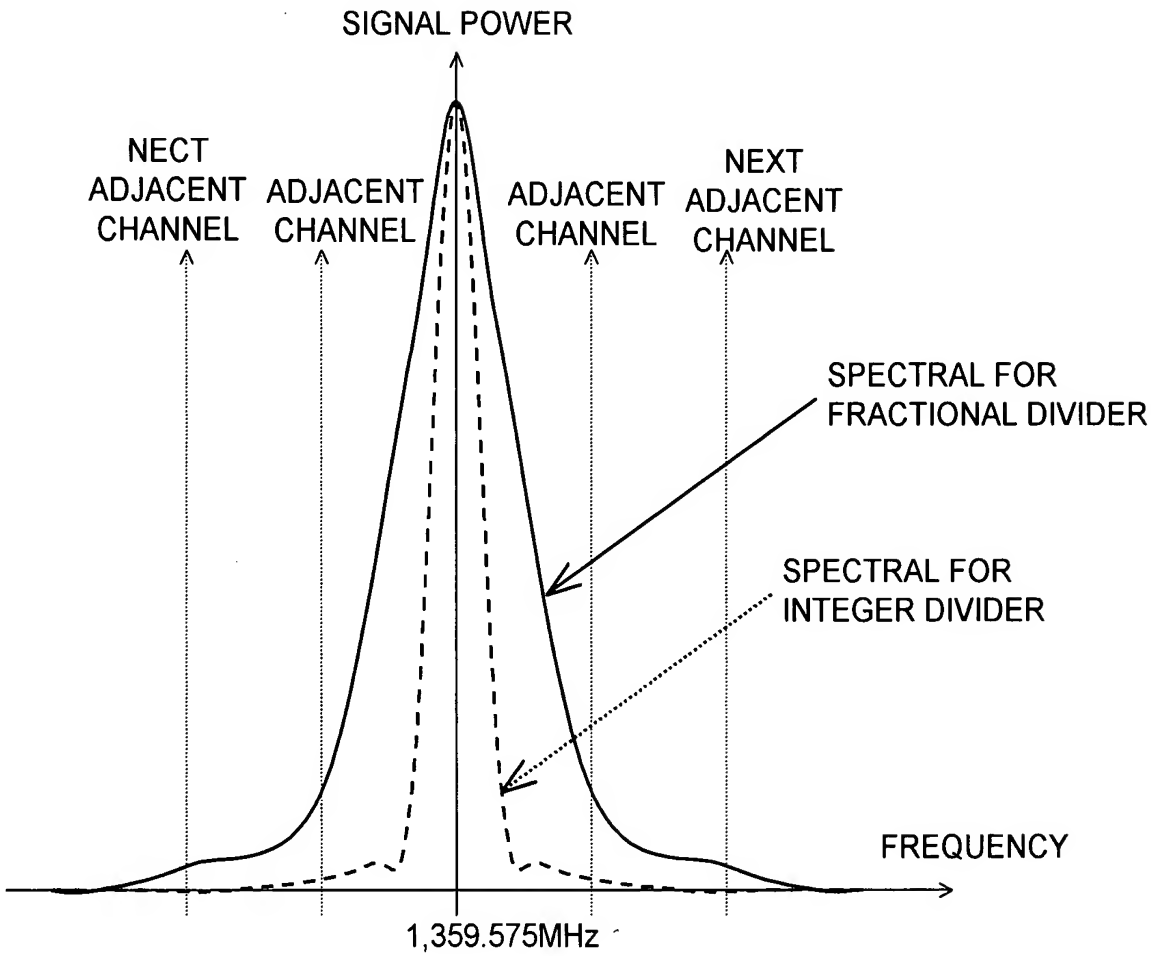

REPRESENTATIVE VALUE 819KHz
REPRESENTATIVE VALUE 949KHz
102
101
ANTENA SWITCH
301
302
303
304
130MHz
260MHz
105
106
FRACTIONAL DIVIDER
400KHz
305
PHASE COMPARATOR
306
103
307
LPF
REPRESENTATIVE VALUE 689KHz
308
VCO (600MHz BAND)
INTERMEDIATE FREQUENCY SECTION
BASEBAND PROCESSOR/ CONTROLLER
VCO (1300MHz BAND)
408
407
LPF
REPRESENTATIVE VALUE 1359KHz
104
406
PHASE COMPARATOR
405
600KHz
FRACTIONAL DIVIDER
REPRESENTATIVE VALUE 1489KHz
REPRESENTATIVE VALUE 1441KHz
401
402
403
404
130MHz
82MHz

FIG. 10


SIGNAL POWER
NECT ADJACENT CHANNEL
ADJACENT CHANNEL
ADJACENT CHANNEL
NEXT ADJACENT CHANNEL
SPECTRAL FOR FRACTIONAL DIVIDER
SPECTRAL FOR INTEGER DIVIDER
FREQUENCY
1,359.575MHz